

Progress Report: The Influence of Source and Rate of Nitrogen and Potash on the Yield and Grade of Katahdin Potatoes, 1964.

George A. Marlowe, Jr. and Floyd Lower  
Department of Horticulture Mimeo. Series 312

I. Introduction

Results from the 1963 investigation of nitrogen rate on the yield and quality of Ohio grown potatoes showed marked yield depressions associated with excess nitrogen application. Of the four rates studied, 0, 60, 120 and 240 pounds of nitrogen per acre, it was found that rates beyond 80-85 lbs. per acre resulted in a decrease in the total and marketable yield and the pounds of dry matter per acre produced. It must be borne in mind, however, that dry season conditions prevailed at all five locations in which the studies were made during 1963.

In 1964, this nitrogen study was extended to include an appraisal of four nitrogen levels accompanied by three potash carriers from three different sources at two locations.

The Ohio Agricultural Experiment Station and Ohio Agricultural Extension Service is deeply grateful for the excellent cooperation granted by Mr. Harold Thompson, Hanoverton, Ohio, and Mr. Donald Becker, Beach City, Ohio on whose farms these studies were made.

We would like to acknowledge the provision of fertilizer materials used in this study. The nitrate of potash was granted by the Southwest Potash Corporation, and the 12-9-6 Aqua Humus was provided by American Humates, Inc.

II. Methods

Double row plots, fifty feet in length were planted in a randomized block design with 3 replicates on April 16 and 17, 1964. Forty-four feet of each plot was harvested on September 1st and 18th respectively and machine graded the following day. Specific gravity determinations were made after 10 days in storage at 45° F by hydrometer. The treatment schedules are presented in Table 1.

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Table 1. Schedule of Treatments, Rate and Source of Nitrogen and Potash  
Study on Katahdin Potatoes. Hanoverton, Ohio, 1964.

<u>Source or Combination</u>		<u>Amt. of Nutrient Supplied, Lb./Acre</u>		
		<u>Nitrogen</u>	<u>Phosphate</u>	<u>Potash</u>
A. Nitrate of Potash and Super Phosphate 20%	I	52	120	176
	II	105	120	352
	III	130	120	440
B. Sulfate of Potash, Amm. Nitrate and Treble Superphos. 46%	I	52	120	176
	II	105	120	352
	III	130	120	440
C. Humic Acid Deriv. as 12-9-6, and separately Treble Superphosphate 46%	I	52	120	176
	II	105	120	352
	III	130	120	440

Treatment applications were compounded from the above materials and brought up to a standard volume of delivery by the addition of ground, sterilized tobacco stems. The compounded materials were bagged in polyethylene units until date of application, except in the case of the Aqua Humus or 12-9-6 Humic Acid Derivatives. The source of phosphatic material was not applied until date of planting, at which time it was added to the flowing mixture on the delivery belt of the planter.

### III. Cultural Practices and Climatological Conditions

#### A. Cultural Practices

Fertilizer treatments were applied in bands at planting time. All pesticides were applied to foliage, systemic insecticides and herbicides were not used. Plots on the Becker farm were irrigated 3 times, and on the Thompson farm given 2.5 inches. Seed was planted 9.5 inches apart in rows 36 inches apart.

#### B. Soil Test Results

	<u>Becker Farm</u>	<u>Thompson Farm</u>
Organic matter, %	2.0	2.0
pH	6.1	5.3
Lime deficit, TPA	2	4
Phosphorus, lbs.	245	71
Potassium, lbs.	378	384
Magnesium, lbs.	200	40
Calcium, lbs.	2200	1500
Soil Type	Sandy Loam	Light Brown silt loam
Identity	Huntington-Wheeling	Holston silt loam

#### C. Rainfall

	<u>Becker Farm</u>	<u>Thompson Farm</u>
April	4.8	5.6
May	2.6	4.2
June	3.4	4.7
July	2.0	3.4
August	2.5	3.2
September	1.1	4.2

#### IV. Results

As may be noted in Table 2, the total yield increased with increases in nitrogen with all sources. These increases, however, were not statistically significant between levels or sources for total yield, marketable yield or grade. For all practical purposes, in consideration of the results of this experiment all three sources performed equally well.

The yields recorded from the Becker farm were significantly greater than those on the Thompson farm, but the grade was highest at the Thompson location. The mean yield of marketable tubers was 391.9 cwt. per acre and 223.4 cwt. respectively, with grades 96.4% and 95.1% in that same order due to location.

#### V. Summary

Katahdin potatoes were grown at two locations under three levels of nitrogen associated with three different carriers; nitrate of potash 13-0-44, Aqua Humus 12-9-6, and an ammonium nitrate-sulfate of potash combination. Phosphorus was supplied in the 20% and 45% superphosphate form. The nitrogen and potash levels varied simultaneously, with phosphate kept constant at 120 pounds per acre.

Yield increased with increases in nitrogen and potash level with all sources, but neither grade nor yield difference due to treatment were statistically significant.

Table 2. The Influence of Rate and Source of Nitrogen and Potassium From Three Carriers on the Yield and Grade of Katahdin Potatoes, Ohio, 1964.

Treatment Level		Total Yield	Mkt. Yield	U. S. No. 1
Source	Rate	Cwt/Acre	Cwt/Acre	%
Nitrate of Potash	I	283.6	274.7	96.8
	II	305.1	287.5	94.9
	III	310.1	297.4	96.3
	Means	299.6	286.5	96.0
Am. Nitrate	I	256.4	248.5	97.0
	II	300.4	289.2	96.5
	III	314.6	302.1	96.0
	Means	290.5	279.9	96.5
Aqua Humus	I	270.0	254.7	94.5
	II	271.9	259.7	94.9
	III	311.2	302.4	97.0
	Means	284.3	272.3	95.5
F Value		2.487	2.120	0.914
F Value required for significance 0.05% level			2.59	0.01% Level 3.89

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